Oh Deer!

Age: Grades 4—12

Subjects: Science, Math, Social Studies, Physical Education

Skills: application, comparing similarities and differences, description, discussion, generalization, kinaesthetic concept development, observation, psychomotor development

Duration: 30-45 minutes

Group Size: 15 and larger recommended

Setting: indoors or outdoors; large area for running needed

Conceptual Framework Reference I.C.2., III.B., III.B.2., III.B.3., III.B.5., III.C., III.C.1., III.C.2., III.E., III.E.1.,III.E.2., III.F., III.F.1., III.F.2., III.F.3., III.F.4., III.F.5., IV.C., IV.C.1., IV.C.2.

Key Vocabulary: habitat, limiting factors, predator, prey, population, balance of nature, ecosystem

Objectives

Students will be able to:

1) identify and describe food, water, and shelter as three essential components of habitat;

2) describe the importance of good habitat for animals;

3) define "limiting factors" and give examples; and

4) recognize that some fluctuations in wildlife populations are natural, as ecological systems undergo a constant change.

Method

Students become "deer" and components of habitat in a highly involving physical activity.

Background

A variety of factors affects the ability of wildlife to successfully reproduce and to maintain their populations over time. Disease, predator/prey relationships, varying impacts of weather conditions from season to season (e.g., early freezing, heavy snows, flooding, drought), accidents, environmental pollution, and habitat destruction and degradation are among these factors.

Some naturally caused as well as culturally induced limiting factors serve to prevent wildlife populations from reproducing in numbers greater than their habitat can support. An excess of such limiting factors, however, leads to threatening, endangering, and eliminating whole species of animals.

The most fundamental of life's necessities for any animal are food, water, shelter, and space in a suitable arrangement. Without these essential components, animals cannot survive.

This activity is designed for students to learn that:

a. good habitat is the key to wildlife survival;
b. a population will continue to increase in size until some limiting factors are imposed;
c. limiting factors contribute to fluctuations in wildlife populations; and
d. nature is never in "balance", but is constantly changing.

Wildlife populations are not static. They continuously fluctuate in response to a variety of stimulating and limiting factors. We tend to speak of limiting factors as applying to a single species, although one factor may affect many species. Natural limiting factors, or those modelled after factors in natural systems, tend to maintain populations of species at levels within predictable ranges. This kind of "balance in nature" is not static, but is more like a teeter-totter than a balance. Some species fluctuate or cycle annually. Quail, for example, may start with a population of 100 pairs in early spring, grow to a population of 1200 birds by late spring, and decline slowly to a winter population of 100 pairs again. This cycle appears to be almost totally controlled by the habitat components of food, water, shelter, and space, which are also limiting factors. Habitat components are the most fundamental and therefore the most critical of limiting factors in most natural settings.

This activity is intended to be a simple but powerful way for students to grasp some basic concepts: that everything in natural systems is interrelated; that populations of organisms are continuously affected by elements of their environment; and that populations of animals do not stay at the same static number year after year in their environment, but rather are continually changing in the process of maintaining dynamic equilibria in natural systems.

The major purpose of this activity is for students to understand the importance of suitable habitat, as well as factors that may affect wildlife populations in constantly changing ecosystems.

Materials

area — either indoors or outdoors — large enough for students to run, e.g., playing field; chalkboard or flip chart; writing materials

Procedure

1. Begin by telling students that they are about to participate in an activity that emphasizes the most essential things that animals need in order to survive. Review the essential components of habitat with the students: food, water, shelter, and space in a suitable arrangement. This activity emphasizes three of those habitat components — food, water, and shelter — but the students should not forget the importance of the animals having sufficient space in which to live and that all the components have to be in a suitable arrangement or the animals will die.

2. Ask your students to count off in fours. Have all the ones go to one area; all twos, threes and fours go together to another area. Mark two parallel lines on the ground or floor nine to 18 metres apart. Have the ones line up behind one line; the rest of the students line up behind the other line.

3. The ones become "deer". All deer need good habitat in order to survive. Ask the students what the essential components of habitat are again: **food**, **water**, **shelter**, and **space in a suitable arrangement**. For the purposes of this activity, we will assume that the deer have enough space in which to live. We are emphasizing food, water, and shelter. The deer (the ones) need to find food, water, and shelter in order to survive. When a deer is looking for **food**, it should clamp its hands over its stomach. When it is looking for **water**, it puts its hands over its mouth. When it is looking for **shelter**, it holds its hands together over its head. A deer can choose to look for any one of its needs during each round or segment of the activity; **the deer cannot, however, change what it is looking for**, e.g., when it sees what is available, **during that round. It can change again what it is looking for in the next round, if it survives**.

4. The twos, threes, and fours are food, water, and shelter — components of habitat. Each student gets to choose at the beginning of each round which component he or she will be during that round. The students depict which component they are in the same way the deer show what they looking for; that is, hands on stomach for food, etc.

5. The game starts with all players lined up on their respective lines (deer on one side; habitat components on the other side) — and **with their backs to the students at the other line**.

6. The facilitator or teacher begins the first round by asking all of the students to make their signs — each deer deciding what it is looking for, each habitat component deciding what it is. Give the students a few moments to get their hands in place — over stomachs, mouths, or over their heads. (As you look at the two lines of students, you will normally see a lot of variety — with some students water, some food, some shelter. As the game proceeds, sometimes the students confer with each other and all make the same sign. That's okay, although don't encourage it. For example, all the students in habitat might decide to be shelter. That could represent a drought year with no available food or water.)

7. When you can see that the students are ready, count: "One... two... three". At the count of three, each deer and each habitat component turn to face the opposite group, continuing to hold their signs clearly.

8. When deer see the habitat component they need, they are to run to it. Each deer must hold the sign of what it is looking for until getting to the habitat component person with the same sign. Each deer that reaches its necessary habitat component takes the "food", "water", or "shelter" back to the deer side of the line. This is to represent the deer's successfully meeting its needs and successfully reproducing as a result. Any deer that fails to find its food, water, or shelter dies and becomes part of the habitat. That is, in the next round, the deer that died is a habitat component and so is available as food, water, or shelter to the deer who are still alive. NOTE: When more than one deer reaches a habitat component, the student who gets there first survives. Habitat components stay in place on their line until a deer needs them. If no deer needs a particular habitat component during a round, the habitat component just stays where it is in the habitat. The habitat person can, however, change which component it is from round to round.

9. You as the facilitator or teacher keep track of how many deer there are at the beginning of the game, and at the end of each round you record the number of deer also. Continue the game for approximately 15 rounds. Keep the pace brisk, and the students will thoroughly enjoy it.

10. At the end of the 15 rounds, gather the students together to discuss the activity. Encourage them to talk about what they experienced and saw. For example, they saw a small herd of deer (seven students in a class size of 28) begin by finding more than enough of its habitat needs. The population of deer expanded over two to three rounds of the game, until the habitat was depleted and there was not sufficient food, water, and shelter for all the members of the herd. At that point, deer starved or died of thirst or lack of shelter, and they returned as part of the habitat. Such things happen in nature also.

11. Using a flip chart pad or an available chalkboard, post the data recorded during the game. The number of deer at the beginning of the game and at the end of each round represent the number of deer in a series of years. That is, the beginning of the game is year one; each round is an additional year. Deer can be posted by fives for convenience. For example:

The students will see this visual reminder of what they experienced during the game: the deer population fluctuated over a period of years. This is a natural process, as long as the factors that limit the population do not become excessive to the point where the animals cannot successfully reproduce. The wildlife populations will tend to peak and rebuild, peak and rebuild, as long as there is good habitat and sufficient numbers of animals to successfully reproduce.

■ *12.* In discussion, ask the students to summarize some of the things they have learned from this activity. What do animals need to survive? What are some of the "limiting factors" that affect their survival? Are wildlife populations static, or do they tend to fluctuate, as part of an overall "balance of nature"? Is nature ever really in "balance", or are ecological systems involved in a process of constant change?

Extensions

■ *1.* When you have finished tabulating the graph data and discussing it, ask the students if they have ever heard of the Hudson Bay trappers in Canadian history. Tell them, briefly, who they were.

There is a hundred years, or more, of records of the activities of these trappers. In those records are some interesting data. These data refer to pelts shipped from North America to Europe, particularly the pelts of snowshoe hares and lynx.

Researchers have found that snowshoe hare populations seem to peak about every seven to nine years and then crash, repeating the process over each comparable time period. So, a snowshoe hare population graph would look like this:

It has also been discovered that lynx populations do the same thing — except that they do it one year behind the hare populations. The combined graph would look like this:

Graph this right over the deer graph that you made, adding first the hares and then the lynx. Ask the students:

- Which animal is the predator? Which prey?
- Are predators controlling the prey, or are prey controlling the predators? (We have been brought up to "know" that predators control the prey — and are now discovering that this is not so. The number of prey animals available tells us how many predators can live in the area.)
- Is this like the deer habitat game we just played? Who controls? (Sometimes the habitat — when the deer population is not too large; sometimes the habitat — when the deer population "gets on top of it" and destroys the vegetative food and cover.)

■ *2.* Some recent research has added a new dimension to the story of the snowshoe hares and the lynx.

It has been found that the major food of the hare is a small willow. As hare populations grow, the use of the willow plants grows too. But, when the willow plant has been "hedged" or eaten back so far, the plant generates a toxin (poison) which precludes use by the hare. That is when the hare population crashes, followed by the crash of the lynx population about a year later. Then the willow, relieved of pressure, begins to grow again. The hare population begins to grow in response, and last of all, within a year or so, the lynx population follows. And the cycle has begun again — over and over — every seven to nine years.

Discuss the "balance of nature". Is it ever in "balance"?

Aquatic Extension

Do the activity in exactly the same fashion, except substitute an aquatic species of wildlife. The essentials are still the same. In this case, rather than assuming all the necessary **space** is available, assume all the **water** is available but space is needed, as is food and shelter. Hands on stomach is food, hands together over head is shelter — and **arms out to the side is space**. Otherwise, conduct the activity in the same fashion. The objective remains the same, except that now you are identifying food, shelter, and space as three essential components of habitat. Examples of possible aquatic species: salmon, frog.

Evaluation

1. Name three essential components of habitat.

2. Define "limiting factors". Give three examples.

3. Examine the graph. What factors may have caused the following population changes:

a. between years 1 and 2?
b. between years 3 and 4?
c. between years 5 and 6?
d. between years 7 and 8?

Which of the following graphs represents the more typically balanced population?